

appendix B

MENU OF TRANSPORTATION – LAND USE STRATEGIES

Below is the list of strategies summarized in this appendix.

Part 1. Strategies to relieve or prevent congestion and preserve mobility

- 1.1 Contain development within limited growth area boundaries
- 1.2 Limit the number of new driveways onto major collectors and arterials
- 1.3 Retrofit the number, location, and design of existing driveways
- 1.4 Provide for alternative routing of traffic
- 1.5 Interconnect the local street system
- 1.6 Institute turning controls
- 1.7 Improve wayfinding
- 1.8 Work toward job-housing balance

Part 2. Strategies to enhance the form and pattern of development for optimal use of the transportation system

- 2.1 Diversify allowed land uses
- 2.2 Locate residences and uses needed by neighborhood residents, such as elementary schools and stores with convenience goods and services, close to each other
- 2.3 Increase density of development to expand transportation and economic opportunities
- 2.4 Create a community sanitary district for subsurface wastewater disposal
- 2.5 Prepare and adopt an “official map” for streets and other public improvements
- 2.6 Modify use, supply, and location of public parking in village centers and downtowns
- 2.7 Evaluate and consider standards for single-parcel off-street parking
- 2.8 Locate public buildings to meet LEED siting criteria

Part 3. Strategies to introduce or expand modes of passenger transportation

- 3.1 Extend and connect the pedestrian network of sidewalks and cross-walks
- 3.2 Provide for bicycle lanes
- 3.3 Introduce or expand ride sharing
- 3.4 Introduce or expand demand-response transit service
- 3.5 Introduce or expand fixed-route bus service
- 3.6 Prepare for passenger rail service

Part 4. Strategies to protect and get the most out of regional transportation facilities

- 4.1 Anticipate regional transportation needs for an undeveloped or new growth area
- 4.2 Allow for unimpeded operation and expansion of regional transportation facilities
- 4.3 Upgrade connectivity between industrial areas and regional transportation facilities

Part 5. Strategies to maintain quality of place

- 5.1 Design or retrofit streets for human scale
- 5.2 Retrofit streets and highways using flexible, “context sensitive” design
- 5.3 Institute traffic calming measures
- 5.4 Conduct a safety audit
- 5.5 Adopt performance standards, including for signs, parking, internal circulation and landscaping, for highway-oriented development
- 5.6 Conduct a visual assessment and adopt view corridor standards
- 5.7 Incorporate BMPs for erosion control and stormwater management into subdivision and site plan review ordinances
- 5.8 Assure proper design of culverts for streams with fish populations

PART I. Strategies to relieve or prevent congestion and preserve safe mobility

1-1. Contain development within limited growth area boundaries

Objective: to prevent continuous commercial strip development that introduces turning conflicts, increases congestion and crash rates, and changes the character of community.

Description: Maine's Growth Management Act requires local comprehensive plans to designate growth areas, which are areas considered suitable for orderly residential, commercial, or industrial development and into which most development projected over 10 years is directed.

The Growth Management Act's rule requires growth areas along arterials and mobility corridors to be configured to avoid strip development and promote nodes or clusters of development.

Thus, growth areas along arterial and collector roads should not be continuous. Unless circumstances clearly dictate otherwise, they should be limited to segments of roadway that are natural transitions between villages or town centers and rural portions of the corridor or around nodes at key intersections. These segments might extend, for example, to the limits of an urban compact boundary, as defined by MaineDOT, from a village area to a major intersection or interchange, or short distances from a key intersection. These segments should be limited to less than 1 mile, and preferably to about ½-mile. A commercial growth area or combination of commercial growth areas typically should encompass a relatively small percentage of the frontage of a corridor within a town or group of contiguous towns. Lincolnville's comprehensive plan illustrates a series of well-defined growth areas centered on numbered highways. See Figure B-1. To the greatest extent possible, the growth areas should exclude stretches of undevelopable areas, such as wetlands, and avoid scenic stretches or areas with significant view corridors.

Note: The strategy of establishing limited growth area boundaries is not limited to arterials and mobility corridors. More generally, all growth areas, "to the greatest extent practicable, must be limited to an amount of land area and a configuration to encourage compact, efficient development patterns (including mixed uses) and discourage development sprawl and strip development."

Having established limited growth area boundaries, there is a variety of techniques to successfully direct most growth into them. Some of these strategies are included in this Appendix (see, e.g., **1.5 Interconnect the local street system, 2.3 Increase density of development, 2.5 Prepare and adopt an "official map" for streets and other public improvements**). A good discussion of directing growth into growth areas also is included in the State Planning Office's report, [*Updating Your Comprehensive Plans: 50 Recommendations for Making Plan Updates More Effective*](#). The most important ingredient, however, is local determination and commitment to achieve a relatively compact form of growth.

Lincolnville, ME

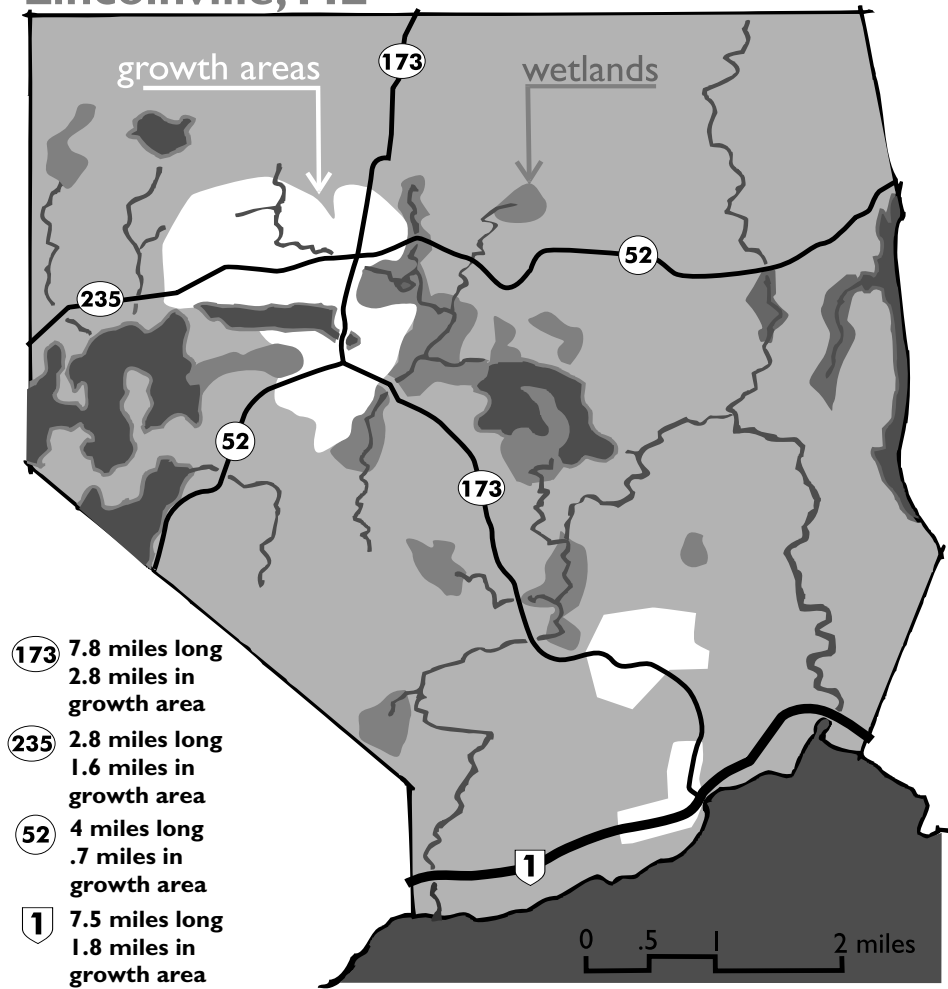


Figure B-1.

Well-defined
growth areas along
numbered highways

PART I. Strategies to relieve or prevent congestion and preserve safe mobility

1.2 Limit the number of new driveways onto major collectors and arterials

Objective: To minimize conflicts between turning and moving traffic and related crashes and congestion, while providing reasonable access to adjacent properties.

Description: Ideally, a community will take steps to limit the number of driveways along major collectors and arterials with posted speed limits of 45 mph (fewer if speed limit is higher) to about 20 per mile (curb cuts opposite each other count as one). A basic strategy to achieve this is to incorporate into the performance standards section of a zoning or land use ordinance a limit of one new curb cut per lot of record as of the date of adoption of the standard. The effect of this standard is to require owners of parcels with extensive frontage along a major collector or arterial to provide for internal circulation — such as shared driveways and frontage roads (see Figure B-2) — if and when they develop their properties in the future.

Short of this policy, communities can control curb cuts in several ways:

- Without explicitly limiting new curb cuts to one per lot of record, a community can require as part of its subdivision regulations that a developer demonstrate that a frontage road or shared access, rather than individual driveways to a collector or arterial, is not possible to achieve.
- If additional curb cuts to the collector or arterial are deemed necessary, include in the performance standards section of a zoning, land use, or site plan review ordinance a limit of one two-way driveway (or two one-way driveways) for most uses. High volume commercial uses may require two onto the collector or arterial, but make this a last resort if no other alternatives (sharing drives, two one-way operating drives, a second drive to a side street, etc.) are available.

Design standards should specify that driveways be spaced a sufficient distance apart based on the posted speed limit of the road in question, in accordance with MaineDOT guidelines, and that the geometry of the driveways – width, throat length, and curb return radius—also meet MaineDOT guidelines. See also Maine’s [Site Plan Review Handbook](#).

PART I. Strategies to relieve or prevent congestion and preserve safe mobility

1.3 Retrofit the number, location, and design of driveways

Objective: To reduce the number of existing access points along a roadway and to improve the design and operation of driveways that remain.

Description: By providing greater separation between access points, fewer access points, restriction of turning movements and use of auxiliary turn lanes, the rate of conflict experienced by motorists is reduced, thereby lowering crash rates and improving traffic flow. The proper balance and design benefits both property development and street function.

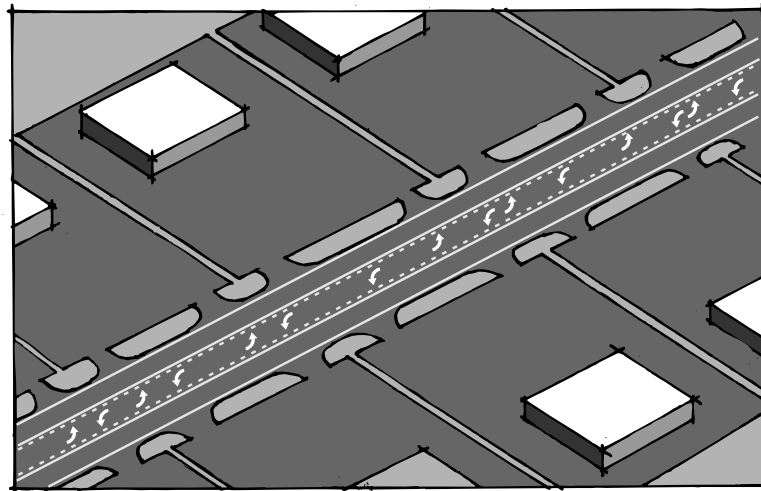
- **Site plan permitting.** At the time of expansion or alteration of use, require as part of site plan permit a consolidation of exiting driveways and reconfiguration to meet MaineDOT geometric standards, including proper width, length, and curb return radius.
- **Shared access.** As part of upgrading of the roadway, convene adjacent property owners to identify means of providing shared access, removing driveways from the functional area of intersections, and reconfiguring driveways to enable safe and efficient movement of vehicles to and from parking areas. See Figure B-2.
- **Removal of turning vehicles from through-traffic lanes.** Provide turning lanes, both left and right, to allow drivers to decelerate gradually out of the through lane.
- **Opportunities to reduce access points.** Alternatives include frontage streets and a supporting road circulation system where access is provided on existing or new side streets.

PART I. Strategies to relieve or prevent congestion and preserve safe mobility

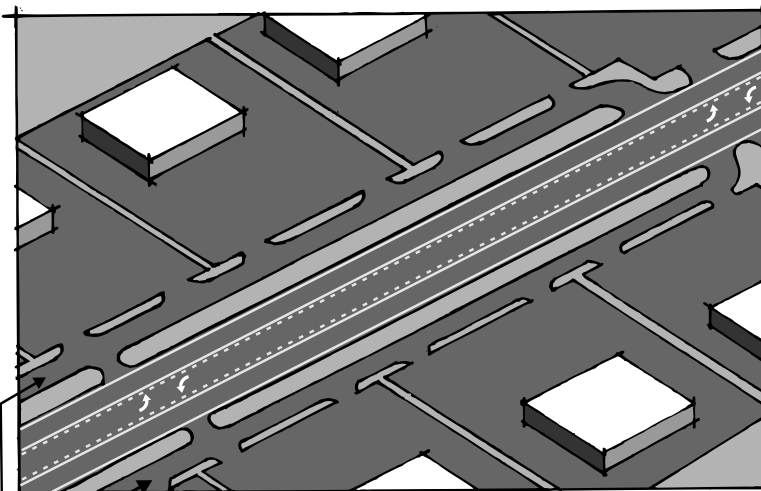
Figure B-2.
Frontage roads and
shared access

Frontage roads parallel the main road, with limited access points. Each business has its own access off the frontage road. In shared access arrangements, the development of a large parcel (or the retrofit of an existing situation) is arranged so that there is typically a single access from the main road, and then a controlled flow between the individual lots or sites that were carved out from the original parcel.

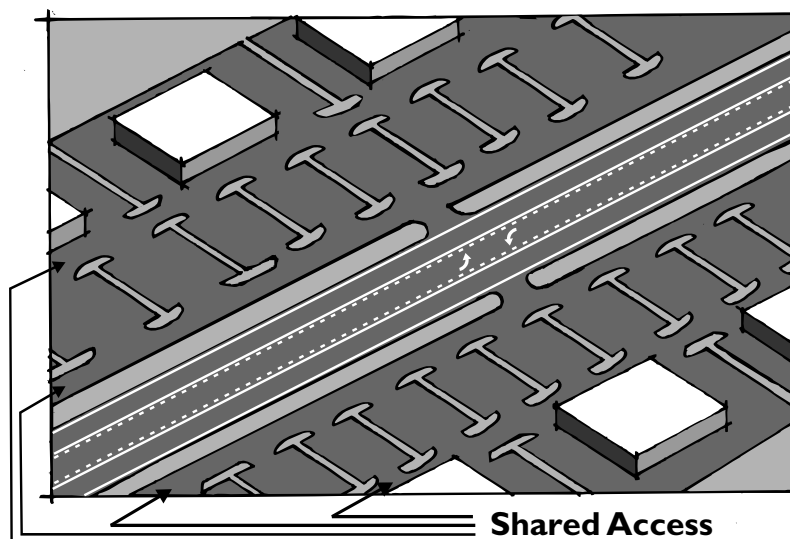
If a community enacts a strong access management policy, whether for new development or to retrofit an existing situation, alternatives to multiple access points such as these are necessary.



Multiple Access



Frontage Roads



Shared Access

PART I. Strategies to relieve or prevent congestion and preserve safe mobility

1.4 Provide for alternate routing of traffic

Objective: To provide relief to existing roads and sidewalks when they are at capacity or when there is conflict between types of traffic.

Description: Alternative routing can be very short-distance (e.g., to allow traffic to get from one commercial use to another without entering back onto an arterial) or long-distance (e.g., a regional bypass road.) The interconnection of local streets also is an alternative routing technique but has broader purposes and is discussed separately in the next strategy.

Approaches to alternate routing include:

- **Frontage roads.** Frontage roads are short roadway segments that connect adjacent parcels of commercial development and have limited access points along the parallel roadway. See Figure B-2. Frontage roads can be placed either in front of or behind commercial parcels. They can be specified within subdivision ordinances as a technique for complying with limits on curb cuts. (See **1.2 Limit the number of new driveways.**)
- **Bypasses.** Bypasses can be either local or regional in nature. Local bypasses can provide relief to short, congested sections of downtowns, while regional bypasses provide relief to longer sections of strip commercial development or overloaded commercial centers. Any bypass may be difficult to achieve because of right-of-way, neighborhood, and expense issues. But opportunities for local bypasses do exist. For example, unbuilt public ways may exist in a relatively rural part of town; or connection may be possible across public property; or two segments of an existing right-of-way may need only a modest connection to create a local bypass; or an existing road that is used as a de facto local bypass could be upgraded for that purpose, with accompanying revisions to zoning districts and performance standards.
- **Truck Routes.** Designated routes for trucks can be established to reduce noise impacts through downtowns or established neighborhoods. Truck routes can be established along existing street networks, new development infrastructure, or along bypasses. Particular attention needs to be paid to the established [Heavy Haul Truck Network](#), the network of arterials that are part of Maine's freight system.
- **Alternative Transportation Facilities.** Alternate routing can also include developing infrastructure for multimodal use, such as sidewalks, bike lanes, transit stops, and park and ride lots. These would be located at key points within a community to link to existing multimodal networks. A key purpose of interconnected local streets, for example, is to enable pedestrians and bicyclists to avoid travel along busy collectors or arterials. (See the full set of strategies on introducing or expanding alternative modes; see **1.5 Interconnect the local street network**).

PART I. Strategies to relieve or prevent congestion and preserve safe mobility

1.5 Interconnect the local street system

Objective: To provide a circulation system that allows neighborhood residents with a safe, convenient way to pass through a neighborhood to local destinations. This also provides options for emergency vehicles

Description: A local street system is interconnected if there is more than one way for autos, pedestrians, and bicycles to move from one street to another and to local destinations within the neighborhood without needing to go out onto collector streets or arterial roads.

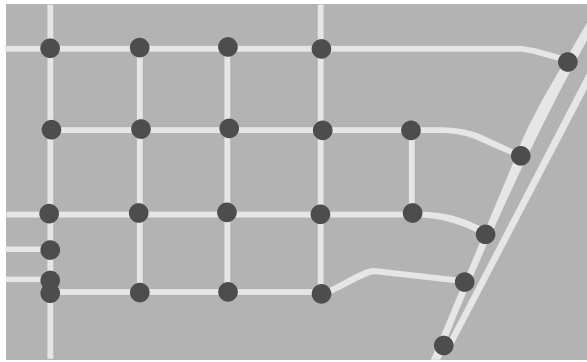
A measure of interconnection is the “link-to-node ratio.” A “link” is a section of road between intersections. A “node” is an intersection or the head of a cul de sac or other dead end. The more links there are for each node, the greater the interconnection. Communities should strive for a ratio of 1.4 links per node within a given neighborhood, especially within designated growth areas, including downtowns and village centers. This may not be possible in areas with many veins of poor soils or other natural characteristics that limit street layout. But ratios of 1.2 or 1.3 should almost always be possible with reasonable planning. Where street connections are not possible, pedestrian or bicycle paths can provide some of the benefits of interconnection.

Where dead-end streets are prevalent, it is difficult to bring about interconnection unless the Town owns land that will enable linkages. However, this problem can be reduced in the future if the subdivision ordinance requires that any subdivision provide for a right-of-way connection from the proposed subdivision to any adjacent, vacant parcel. The right-of-way should be dedicated to town ownership as part of the subdivision plan. It would be converted to a road by the developer of the adjacent vacant parcel at the time of that parcel’s subdivision.

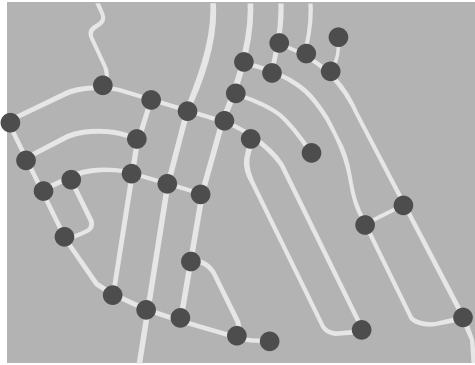
The best overall approach to assure the interconnection of local roads is through the preparation, in cooperation with owners of contiguous vacant lands, of an “official map” of streets and other public improvements. This official map will then be incorporated into the Town’s comprehensive plan. (See 2.5 **Prepare and adopt an “Official Map”**).

Note: in truly rural areas, where residential development is very low density (e.g., fewer than one unit per five acres), and conservation subdivisions are a required or common form of development, interconnection may be neither needed nor feasible.

PART I. Strategies to relieve or prevent congestion and preserve safe mobility



Grid Layout: 37 links, 25 nodes = ratio of 1.5



Modified Grid: 42 links, 32 nodes = ratio of 1.3



Figure B-3.
Link-to-nodes
ratio

This ratio is a measure of interconnection of the street system and the choices people have to get from one place to another. In the example above, the grid layout is from a neighborhood in Brunswick, and the modified grid layout is from a neighborhood in Brewer. Each intersection, dead end, and cul-de-sac is a node. Each segment of street between nodes is a link. (Don't count links that are running out of the frame of the diagram.) The more links per node, the greater the connectivity of the neighborhood or community. Sometimes when it is not possible or desirable to create a street connection, a pedestrian or bicycle connection can serve a similar purpose.

PART I. Strategies to relieve or prevent congestion and preserve safe mobility

1.6 Institute turning controls

Objective: To reduce conflicts and improve safety for motorists, pedestrians, and bicyclists.

Description: Key to the process of selecting an appropriate method for controlling turns is defining the specific kinds of turns you need to control: left or right turns; into or out of driveways and sidestreets. The methods of controlling turns fall under four categories:

- Signage – installing No Left turn signs; this requires voluntary compliance by motorists
- Driveway Design – designing a driveway to enter the street at an acute angle that only permits right-turns; this is difficult to retrofit in existing driveways
- One-Way Links – designate a street/driveway as one-way entering the major street and prohibit turns from the major street; however, one-way streets can be unexpected and confusing to motorists
- Non-Traversable Median – a physical barrier in the street that separates traffic traveling in opposite directions, such as a concrete barrier or landscaped island; it should be a minimum 4 feet in width (or 6 feet if pedestrians are expected to wait on the median when crossing the street); requires additional width in the roadway cross-section

A non-traversable median is typically appropriate only in the following situations:

- On a multilane street with ADT in excess of 24,000;
- At a location where right-ins/right-outs at driveways are the only movements deemed acceptable and reconstruction of driveways is not practical;
- On a street where aesthetic considerations are a high priority;
- On a multilane street with a high level of pedestrian activity; or
- At a high crash location or area where it is desirable to limit left turns to improve safety.

PART I. Strategies to relieve or prevent congestion and preserve safe mobility

1.7 Improve Wayfinding

Objective: To assist travelers in safely and efficiently finding their way to destinations in the community or region.

Description: “Wayfinding” is a succession of clues that allows someone to navigate to a desired destination. It is, in other words, a system of information that includes signs, landmarks, and maps. But it is more than that. It is also a continuous system of physical pathways, such as sidewalks and streets, that leads the traveler to the desired destination.

In a community, good wayfinding reduces confusion and unexpected moves by motorists. Conversely, it serves as an invitation to visitors and others unfamiliar with the area to relax as they move through the community.

Basic wayfinding techniques that a community might consider include:

- A consistent system of street signs, with common, identifiable graphic approach
- Clear signage of one-way streets
- Use of off-site business signs along highways on approaches to intersections where travelers must change direction or at the end of “T” intersections, meeting state [Standards for Official Business Directional Signs](#) (available for businesses, services, and points of interest within a 10-mile radius of the proposed location of the sign)
- Community maps that include street names, landmarks, and common destinations, made available at the Town’s web site, at chambers of commerce, and other public venues
- Making sure that sidewalks and bicycle paths are continuous in areas that serve businesses, governmental facilities, and key points of interest
- Providing lighting and architectural or design elements along common pathways

PART 1. Strategies to relieve or prevent congestion and preserve safe mobility

1.8 Work Toward Jobs-Housing Balance

Objective: To reduce vehicle miles and vehicle hours traveled and the related stresses on road systems and quality of life.

Description: Of all the land use-related measures that can reduce burdens on highway systems, achieving a balance between the number of jobs in an area and the number of homes to house the workers in those jobs is among the most effective. Jobs-housing balance means a rough parity between employment and housing at the range of prices affordable to persons with the skills to fill the area's jobs.

Many labor market areas (areas defined by the Department of Labor to encompass job centers and their common commuting areas) almost by definition have jobs-housing balance. For example, the Brunswick Labor Market Area in 2005 had about 33,500 jobs and about 33,200 dwelling units. But this labor market area encompasses nearly 385 square miles – both the job centers and the far reaches of outlying rural towns, from which residents commute in single-occupant autos and put growing pressure on the road system. The challenge is to achieve balance near where the jobs are. Considering Bath and Brunswick by themselves, jobs outnumbered dwelling units almost 2-to-1. In the rest of the labor market area, dwelling units outnumbered jobs by nearly 2.5-to-1.

Alternatively, there might be a focused strategy to build job bases in the cores of growing suburban towns with large residential bases, as has happened, for example, in communities like Falmouth, Topsham, and Scarborough.

In any case, the keys to job-housing balance are:

- Directing growth of both jobs and housing to core areas – in Comprehensive Planning lingo, to designated growth areas – and adopting this as a matter of policy in Comprehensive Plans (see **1.1 Contain development within limited growth area boundaries** as well as several of the strategies in **Part 2** of this Appendix);
- Assuring that lot size and density standards in land use ordinances do not pose artificial barriers to housing in the size and price ranges needed by workers in the community, and supplementing the market's capacity to produce workforce housing with assistance from agencies like the Maine State Housing Authority;
- Planning utility systems so that they will have the capacity to handle this focused development; and
- Cooperating with neighboring communities – whether a growing suburb that strives for a job base or a service center community with an established job base – to work toward complementary job, residential, and mixed-use centers that can be connected by public transportation (see strategies in **Part 3** of this Appendix).